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ABSTRACT

A project was undertaken to develop an occupational matrix in the vocational service area of Industrial Electricity and Electronics. To develop the matrix, researchers administered a mail survey to employers in the following occupational areas: non-electrical machinery, electricity and electronic equipment, miscellaneous repair services, radio and TV repair, electrical and electronic repair shops, armature rewinding shops, and repair services. Respondents were asked to list job titles for their given area of concern, list the number of employees for each job title, and distribute the job titleholders' time across the various work categories. Based on 23 usable responses obtained (a 12.99 percent response rate), researchers constructed separate occupational matrices for the manufacturing categories and for the repair shop and services categories. Because of the small response rate and because of the large number of responses of "non-applicable," it was concluded that the survey population was not representative of the area needing study. Recommendations included calls for further study of the industrial electronics/electricity area and for similar studies in other areas. (The survey and the matrices are included in the report.) (MN)

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FINAL REPORT

"Development of a Statewide Occupational Matrix"

Dr. B. R. West
Project Director

Project #456-80-III-3

Institute For Performance Based
Industrial Training, Inc.
Indianapolis, Indiana

September 30, 1981

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STATEMENT OF OBJECTIVES

Objectives of the Project

The objective of this project was to develop an occupational matrix in the vocational service area of Industrial Electricity and Electronics.

STATEMENT OF THE PROBLEM

There is a growing pressure on the vocational educator to document in specifics, as opposed to generalities, what a student can do as a result of a training program. To communicate this "doing" to the lay public, it must be couched in an everyday, real-life context rather than statements about hours of training, academic or vocational skills attained, or courses taken. The taxpayer and the tuition-paying individual, wanting recognizable and convincing proof that the educational dollar is well spent, is asking for concrete evidence that those graduated from programs can function in a career role. What better proof of a vocational program's efficacy than to be able to say that Graduate A is capable of functioning in job title X rather than possessing "entry level skills" in a broad employment area. The hard evidence supporting this claim is that the potential employee can perform the tasks comprising the job title to a standard referenced in business and industry.

Before attempting to develop a curriculum and implement a vocational program that will yield this kind of hard evidence of performance, the State Board of Vocational and Technical Education thought it necessary to identify the training target. The target which the State Board of Vocational and Technical Education has set for Indiana is the preparation of each individual for a single job title or a cluster of related job titles using programs and curricula which are based on industry-verified job titles and tasks. The first step in the job title-task verification process is the clustering of job titles in an occupational field on the

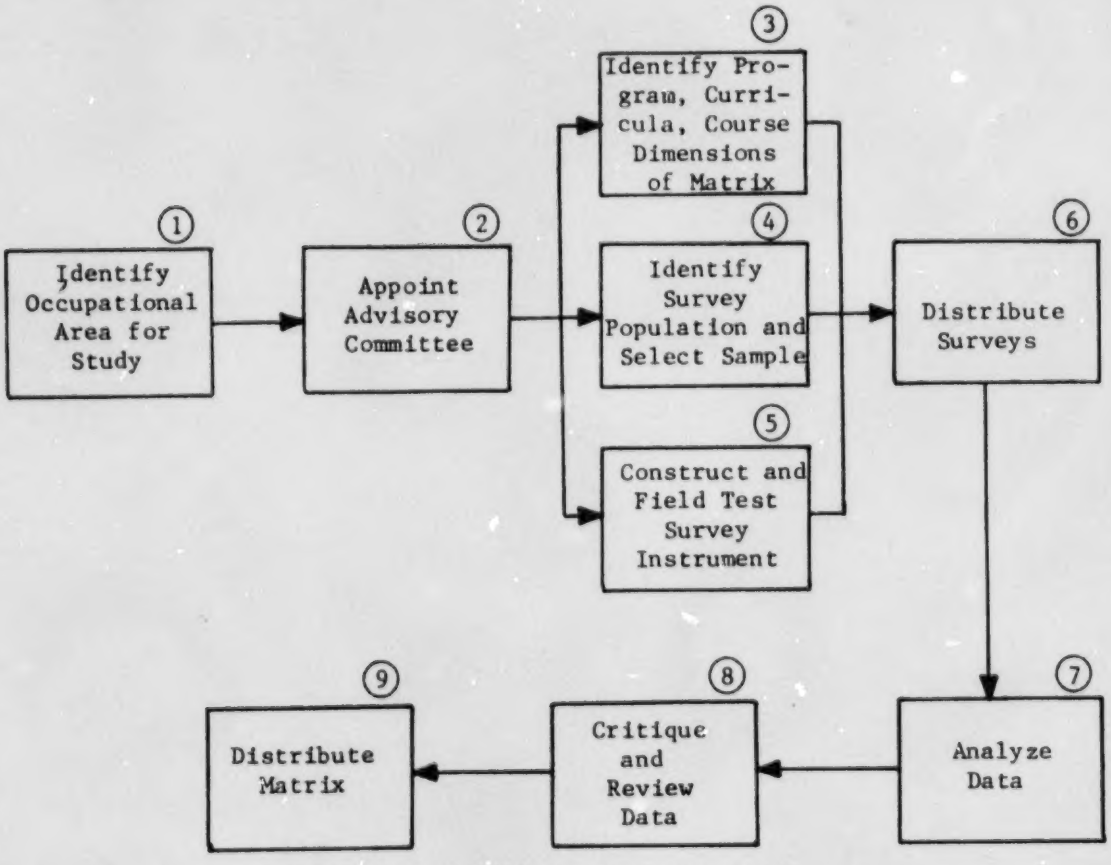
basis of task commonality. The research terminates in a process model to be used by decision makers to administratively structure vocational programs and to identify the tasks corresponding to the job titles. The model is called an occupational matrix.

Since the matrix is the essential first step in the structuring of performance based vocational education (PBVE) programs, there existed a need for a matrix for each existing program area and a need for investigation into areas of the world of work where current vocational programs do not exist. The purpose of this proposal was, therefore, to develop a matrix in the vocational program area of Industrial Electricity and Electronics.

STRATEGIES

Procedure

The developmental steps which were followed to structure the occupational matrix are shown in the following flowchart.



Block 1. A vocational program corresponding to an occupational employment area was identified for study by the State Board of Vocational and Technical Education and relayed to the project director.

Block 2. An advisory committee comprised of local postsecondary teachers and industry representatives in the vocational discipline under investigation was convened. Their purpose was to (a) define or redefine the occupational area, (b) establish tentative parameters of the study, and (c) assist in the preliminary analysis of the occupational cluster and critique, review and interpret the results of the survey. A list of the advisory committee members is shown in Appendix A.

Blocks 3, 4 & 5. The advisory committee met until the following was accomplished:

1. The first three dimensions of the matrix were hypothesized. These dimensions consisted of (1) the occupational cluster subdivided into programs, (2) the programs subdivided into curricula or courses, and (3) the courses identified by a representative listing of job titles. The criteria used to taxonomize the job titles provided for: (1) administrative flexibility and feasibility, (2) open-endedness to add new or emerging occupations, (3) large common task and learning content cores, and (4) assignment of job titles to mutually exclusive groupings. Figure 1 on the following page depicts the taxonomizing framework.

2. A survey population was identified by the State Board of Vocational and Technical Education, stratified and a sample selected. The population was stratified in a manner to yield the greatest number of job titles in an occupational cluster.

3. A survey instrument was constructed to gather job title data. The questionnaire was designed to (1) permit easy response in terms of respondent time and effort and (2) gather unbiased data. The questionnaire essentially asked the respondent to list the job titles of the workers and to categorize them according to the hypothesized matrix

Plan For Program Organization				Derivation of Learning Content			
I	II	III	IV	V	VI	VII	VIII
PROGRAM	CURRICULA	COURSE	JOB TITLE	TASK	COURSE CORE	CURRICULA CORE	PROGRAM CORE
Major groupings of job titles	Second-level groupings of job titles	First-level groupings of job titles	List of all job titles	List of tasks for each	Tasks and learning content common to job titles in	Tasks and learning content common to job titles in	Tasks and learning content common to job titles in
			smallest administrative unit of instruction	JOB TITLE (IV)	COURSE (III)	CURRICULA (II)	PROGRAM (I)

Figure 1

dimensions. Only a few job titles were provided as examples to avoid forcing the respondent to "fit" the company's job titles into ours. Care was taken to allow the respondent to categorize job titles outside the limits of the proposed matrix. The instrument was locally field tested by the advisory committee before mailing. Sample instruments are shown in Appendix B.

Blocks 6 & 7. The surveys were distributed to the sample and the responses analyzed. The results of the findings either substantiated the hypothesized matrix or provided the information necessary to correct the job title taxonomy to conform to the real world.

Block 8. Adjustments needed because of faulty data analysis were made.

Block 9. The matrix was distributed to the State Board of Vocational and Technical Education.

ANALYSIS AND FINDINGS

Description of the Population and Responses

The population for this study was provided by the State Board of Vocational and Technical Education. Dun's Marketing Services, Standard Industrial Classification Statistics were assigned as following; 35: Machinery, Except Electrical; 36: Electric and Electronic Equipment; 76: Miscellaneous Repair Services, specifically 7622: Radio and TV Repair; 7629: Electrical and Electronic Repair Shops; 7694: Armature Rewinding Shops; and 7699: Repair Services, nec. Survey samples and response dissimilarities are shown on pages 9-12. This necessitated the development of two matrices; one for the manufacturing categories and one for the repair shops and services category.

The Sample and Population Description column shows the population stratification. It describes the kinds of companies or businesses that were included in each SIC category. The Sample Size and Population Percentage Sent columns identify the proportion of the population represented by each stratus. The proportion was determined, where possible, by actual count of companies in each stratus in Indiana as provided by Dun's Marketing Services. The company data and addresses were also provided in the Dun and Bradstreet materials and by the State Board of Vocational and Technical Education. The total of the Sample Size column indicates the total number of surveys sent.

The Response side shows the Total Response, Total Usable Response, Response % Rate, Response % Rate Usable and Population % Returned. The

SIC Code	Description	SAMPLE & POPULATION Sample Size	Pop. % Sent	RESPONSE Total Response	Total Usable	Response % Rate	Response % Rate Usable	Pop. % Returned
	SIC 35 -- MACHINERY, EXCEPT ELECTRICAL							
3519	Internal Combustion Engines	1	.33	0	0	0	0	0
3523	Farm Machinery & Equipment	6	2.02	2	0	33.33	0	2.08
3524	Lawn & Garden Equipment	4	1.35	2	2	50.00	5.00	2.08
3531	Construction Machinery	9	3.03	1	1	11.11	11.11	1.04
3532	Mining Machinery	1	.33	0	0	0	0	0
3533	Oil Field Machinery	1	.33	0	0	0	0	0
3534	Elevator, Moving Stairways	1	.33	0	0	0	0	0
3535	Conveyors & Conveying Equipment	4	1.35	2	0	50.00	0	2.08
3536	Hoists, Cranes	1	.33	0	0	0	0	0
3537	Trucks & Tractors, Industrial	3	1.01	2	0	66.67	0	2.08
3541	Machine Tools (metal cut)	3	1.01	1	0	33.33	0	1/04
3542	Machine Tools, Metal Forming	3	1.01	0	0	0	0	0
3544	Special Dies, Tools	88	29.62	27	5	30.68	5.68	28.13
3545	Machine Tool Accessories	11	3.70	2	1	18.18	9.04	2.08
3546	Power Driven Hand Tools	1	.33	1	1	100	100	1.04
3549	Metalworking Machinery, nec	3	1.01	0	0	0	0	0
3551	Food Products Machinery	3	1.01	2	0	66.67	0	2.08
3553	Woodworking Machinery	5	1.68	1	1	20.00	20.00	1.04

SAMPLE & POPULATION				RESPONSE				
SIC Code	Description	Sample Size	Pop. % Sent	Total Response	Total Usable	Response % Rate	Response % Rate Usable	Pop. % Returned
	SIC 35 -- MACHINERY, EXCEPT ELECTRICAL (Cont'd.)							
3554	Paper Industries Machinery	2	.67	0	0	0	0	0
3555	Printing Trades Machinery	11	3.70	1	0	9.09	0	1.04
3559	Machinery, Special Industries	17	5.72	6	2	35.29	11.76	6.25
3561	Pumps & Pumping Equipment	1	.33	0	0	0	0	0
3562	Ball & Roller Bearings	5	1.68	4	4	80.00	80.00	4.17
3563	Air & Gas Compressors	6	2.02	2	1	33.33	16.66	2.08
3564	Blowers & Exhaust & Ventilation Fans	11	3.70	3	1	27.27	9.09	3.13
3565	Industrial Patterns	2	.67	0	0	0	0	0
3566	Speed Gear Changers	2	.67	1	0	50.00	0	1.04
3567	Industrial Furnaces & Ovens	8	2.69	4	3	50.00	37.50	4.17
3568	Power Transmission Equipment	5	1.68	4	3	80.00	60.00	4.17
3569	Industrial Machinery & Equipment, nec	10	3.37	5	3	50.00	30.00	5.21
3573	Electronic Computing Equipment	2	.67	0	0	0	0	0
3574	Calculating & Accounting Machines	3	1.01	1	0	33.33	0	1.04
3581	Automatic Merchandising Machines	2	.67	0	0	0	0	0
3582	Commercial Laundry Equipment	2	.67	1	0	50.00	0	1.04
3585	Refrigeration & Heating Equipment	8	2.69	4	3	50.00	37.50	4.17
3586	Measuring & Dispensing Pumps	2	.67	0	0	0	0	0

	SAMPLE & POPULATION			RESPONSE				
SIC Code	Description	Sample Size	Pop. % Sent	Total Response	Total Usable	Response % Rate	Response % Rate Usable	Pop. % Returned
	SIC 35 -- MACHINERY, EXCEPT ELECTRICAL (Cont'd.)							
3589	Machines, Service Industry, nec	3	1.01	1	0	33.33	0	1.04
3592	Carburetors, Pistons, Piston Rings, Valves	2	.67	0	0	0	0	0
3599	Machinery Except Electrical, nec	43	14.48	16	0	37.21	0	16.67
	SIC 35 TOTALS	297	99.22	96	31	32.32	10.43	99.99
	SIC 36 -- ELECTRICAL & ELECTRONIC EQUIPMENT							
3612	Transformers	3	3.90	0	0	0	0	0
3613	Switchgear & Switchboard Apparatus	3	3.90	1	1	33.33	33.33	4.76
3621	Motors & Generators	5	6.49	1	1	20.00	20.00	4.76
3622	Industrial Controls	3	3.90	2	2	66.66	66.66	9.52
3629	Electrical Industrial Apparatus, nec	5	6.49	0	0	0	0	0
3631	Household Cooling Equipment	1	1.30	1	1	100	100	4.76
3635	Vacuum Cleaners, Household	1	1.30	1	1	100	100	4.76
3643	Current Carrying Wiring Devices	3	3.90	0	0	0	0	0
3644	Wiring Devices, Non-Current Carrying	2	2.60	0	0	0	0	0
3645	Lighting Fixtures, Residential	2	2.60	0	0	0	0	0
3651	Radio & TV Receiving Sets	3	3.90	1	1	33.33	33.33	4.76

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SIC Code	Description	SAMPLE & POPULATION: Sample Size	Pop. % Sent	RESPONSE: Total Response	Total Usable	Response % Rate	Response % Rate Usable	Pop. % Returned
	SIC 36 -- ELECTRICAL & ELECTRONIC EQUIPMENT (Cont'd.)							
3662	Radio & TV Communications Equipment	14	18.18	5	4	5.71	28.57	23.80
3675	Electronic Capacitors	2	2.60	0	0	0	0	0
3677	Electric Coils, Transformers & Other	4	5.19	2	2	50.00	50.00	9.52
3679	Electronic Components, nec	14	18.18	4	1	28.57	7.14	19.04
3691	Bateries, Storage	2	2.60	0	0	0	0	0
3693	X-Ray Apparatus & Tubes	1	1.30	1	1	100	100	4.76
3694	Engines, Electrical Equipment For	7	9.09	0	0	0	0	0
3699	Electric Equipment, nec	2	2.60	2	0	100	0	9.52
	SIC 36 TOTALS	77	100.02	21	15	19.48	19.48	99.96
	SIC 76 -- MISCELLANEOUS REPAIR SERVICES							
7622	Radio & TV Repair	26	14.68	6	6	23.07	23.07	13.63
7629	Electrical/Electronic Repair Shops	23	12.99	12	10	52.17	43.40	27.27
7694	Armature Rewinding Shops	13	7.35	2	2	15.38	15.38	4.55
7699	Repair Services, nec	115	64.97	24	5	20.08	4.34	54.55
	SIC 76 TOTALS	177	99.99	44	23	24.85	12.99	100

Total Response column shows the number of returns for each sample stratum. The Response % Rate column gives the rate of return for each stratus and the Response % Rate Usable column shows the number of usable surveys returned. The Population % Returned shows the ratio of returns between each sample strata and its proportion in the population. By comparing the Population % Sent column with the Population % Returned column, the degree of return bias can be ascertained.

Treatment of the Data

The survey data were recorded by the respondents on the survey forms shown in Appendix B. To explain the treatment of the data, the following instruction page for the manufacturing area will be used.

Each respondent was asked to provide three bits of information about each different job title in the area under study.

1. List each job title for the area of concern.
2. List the number of employees in each job title.
3. Distribute the job title holders' time across the various work categories. The Instruction page tells how this was done.

The job titles reported on the survey form next had to be assigned to a course category on the matrix. The job title was assigned to the course category in which the greatest number of respondents assigned the greatest percentage of time. In the example, Maintenance Electrician was assigned to the General Repair and Installation category while the Control Panel Assembler was assigned to Control Panel Instrumentation.

The resulting matrix is shown in Appendix C.

INSTRUCTIONS

A. Examine the sample form on the following page and note the column headings Included in the MANUFACTURING AREA is:

Power Transmission/Distribution
Control Panel/Instrumentation
Power Generation
General Repair/Installation
Product

These columns are to be used to indicate the percentage of time a worker spends in each of the categories listed.

B. Look at the example on the following page. The sample organization employs a total of three people who are involved in electricity/electronics:

*** 2 Maintenance Electricians. This is their job title...they spend their time in General Repair/Installation. 20% of their time is devoted to Install-Electricity; 10% to Install-Electronics; 40% to Maintain-Electricity; and 30% to Maintain-Electronics.

*** 1 Control Panel Assembler. This worker spends his time in Control Panel/Instrumentation, with 50% in Install-Electricity; 30% in Install-Electronics; 10% in Maintain-Electricity; and 10% in Maintain- Electronics.

C. On the form on page three, list the job titles of your workers who are involved in electricity/electronics and classify them by indicating the percentage of working time they spend in each column.

D. Place the completed form in the enclosed, stamped and addressed envelope.

E. THANK YOU!

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EXAMPLE

Electricity/Electronics Job Title Survey

MANUFACTURING

JOB TITLE	Number of Workers	Power Transmission/ Distribution						Control Panel Instrumentation						Power Generation						General Repair/ Installation						Product						OTHER (Specify)		
		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design				
		Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics			
Maintenance Electrician	2																			20	10	40	30											
Control Panel Assembler	1							50	30	10	10																							

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EVALUATIONS, CONCLUSIONS AND RECOMMENDATIONS

The ultimate evaluation of the project will come after a task survey is made for each job title on the matrix.

In light of the data collected and reviewed, one conclusion is paramount; that the survey population was not representative of the area needing study. There was too great a percentage of "Not Applicable" and non-response to call the data representative of the industrial electricity/electronics area. Two mailings and two follow-ups were conducted to gather the data as presented.

While the company names and addresses as provided by the Dun and Bradstreet SIC numbers were helpful, there was too much diversity within each SIC category. For example, SIC 36 ranged from the manufacture of motors and generators to the manufacture of phonograph records. Additionally, it is still unknown as to what relationship exists between the manufacture of these products and others such as fabricated metals, (SIC 34) and apparel and textiles, (SIC 23).

Further study should not only be conducted within the SICs 35, 36 and 76 to clarify the low response rate and high percentage of "not applicable," but also throughout other industries which employ electricity and electronics personnel. The project advisory committee suggested additional study in the transportation, broadcasting, biomedics and health care industries.

APPENDIX A

Electricity/Electronics Advisory Committee

ELECTRICITY/ELECTRONICS ADVISORY COMMITTEE

1. Tim D. Boling
   WRTV-Channel 6
   1330 North Meridian Street
   Indianapolis, Indiana 46202

2. Paul J. Castagnoli
   WRTV-Channel 6
   1330 North Meridian Street
   Indianapolis, Indiana 46202

3. Greg S. Heady
   Manutek, Inc.
   8108 Zionsville Road
   Indianapolis, Indiana 46268

4. Stephen Kuchler
   Indiana Vocational Technical College
   1315 East Washington Street
   Indianapolis, Indiana 46204

5. Jeff Lohman
   IBEW Local #481
   1331 North Delaware Street
   Indianapolis, Indiana 46202

6. Ronald L. Remke
   c/o Bell Labs
   2525 North Shadeland Avenue
   Indianapolis, Indiana 46206

7. L. J. Sage
   Cummins Engine Company, Inc.
   1900 McCenely Avenue
   Columbus, Indiana 47201

8. Ross Wesner
   Capitol Products Corporation
   P. O. Box 146
   Kentland, Indiana 47951

APPENDIX B

Sample Survey Instruments

April 2, 1981

Plant Manager:

The purpose of this study is to identify the kinds of jobs, by job title, that exist in electricity and electronics, and to identify the tasks performed and the time spent by those job titles.

Tomorrow's workers are in Indiana schools today...and tomorrow's need for a better-trained work force will be even greater than it is today. That's why the Institute for Performance Based Industrial Training, a non-profit organization, and the Indiana State Board of Vocational and Technical Education are dedicated to improving the training available to future Indiana workers.

As no great thing is created suddenly, the process of designing industry-based vocational and technical programs is an involved, but necessary one... one in which we need your help.

Please take a minute to complete the enclosed questionnaire and return it in the attached, self-addressed and stamped envelope.

The information you provide is crucial and your help is essential. This information can only come from business and industry.

Thank you,

Sally

Sally Mathews
Principal Investigator

IPBIT
P.O. BOX 40761
INDIANAPOLIS, INDIANA 46240

INSTRUCTIONS

A. Examine the sample form on the following page and note the column headings Included in the MANUFACTURING AREA is:

Power Transmission/Distribution
Control Panel/Instrumentation
Power Generation
General Repair/Installation
Product

These columns are to be used to indicate the percentage of time a worker spends in each of the categories listed.

B. Look at the example on the following page. The sample organization employ a total of three people who are involved in electricity/electronics:

*** 2 Maintenance Electricians. This is their job title...they spend their time in General Repair/Installation. 20% of their time is devoted to Install-Electricity; 10% to Install-Electronics; 40% to Maintain-Electricity; and 30% to Maintain-Electronics.

*** 1 Control Panel Assembler. This worker spends his time in Control Panel/Instrumentation, with 50% in Install-Electricity; 30% in Install-Electronics; 10% in Maintain-Electricity; and 10% in Maintain- Electronics.

C. On the form on page three, list the job titles of your workers who are involved in electricity/electronics and classify them by indicating the percentage of working time they spend in each column.

D. Place the completed form in the enclosed, stamped and addressed envelop

E. THANK YOU!

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EXAMPLE

Electricity/Electronics Job Title Survey

JOB TITLE	Number of Workers	MANUFACTURING																										OTHER (Specify		
		Power Transmission/ Distribution						Control Panel Instrumentation						Power Generation						General Repair/ Installation						Product					
		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design				
		Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics			
Maintenance Electrician	2																			20	10	40	30											
Control Panel Assembler	1							50	30	10	10																							

30

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Electricity/Electronics
Job Title Survey

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Company Name _____

MANUFACTURING

JOB TITLES	Number of Workers	Power Transmission/ Distribution						Control Panel Instrumentation						Power Generation						General Repair/ Installation						Product						OTHER (Specify)					
		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design		Install		Maintain		Design							
		Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics	Electricity	Electronics						

April 2, 1981

Plant Manager:

The purpose of this study is to identify the kinds of jobs, by job title, that exist in electricity and electronics, and to identify the tasks performed and the time spent by those job titles.

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As no great thing is created suddenly, the process of designing industry-based vocational and technical programs is an involved, but necessary one... one in which we need your help.

Please take a minute to complete the enclosed questionnaire and return it in the attached, self-addressed and stamped envelope.

The information you provide is crucial and your help is essential. This information can only come from business and industry.

Thank you,

Sally

Sally Mathews
Principal Investigator

IPBIT
P.O. BOX 40761
INDIANAPOLIS, INDIANA 46240

INSTRUCTIONS

A. Examine the sample form on the following page and note the column headings. Included in the ELECTRICAL/ELECTRONIC EQUIPMENT REPAIR AREA is:

Electronic Equipment
Electrical Equipment

These columns are to be used to indicate the percentage of time a worker spends in each of the categories listed.

B. Look at the example on the following page. The sample organization employs a total of three people who are involved in electricity/electronics:

*** 2 TV Repair People. This is their job title...they spend their time in Electronic Equipment. 10% of their time is devoted to Private Shops-Gadgets; 15% to Private Shops-Radio; 70% to Private Shops- T.V.; and 5% to Private Shops-Stereo.

*** 1 Adjuster. This person spends his time in Electronic Equipment, with 10% in Customer Service Center-Gadgets; 15% in Customer Service Center-Radio; 65% in Customer Service Center-T.V.; and 10% in Customer Service Center-Stereo.

C. On the form on page three, list the job titles of your workers who are involved in electricity/electronics and classify them by indicating the percentage of working time they spend in each column.

D. Place the completed form in the enclosed, stamped and addressed envelope and return it.

E. THANK YOU!

Electricity/Electronics
Job Title Survey

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Company Name "XYZ Co., Inc."

ELECTRICAL/ELECTRONIC EQUIPMENT REPAIR

JOB TITLES	Number of Workers	Electronic Equipment: Customer Service Center: Gadgets	Radio	T.V.	Stereo	Electronic Equipment: Private Shops: Gadgets	Radio	T.V.	Stereo	Electrical Equipment: Customer Service Center: Motors and Generators	Transformers	Electrical Equipment: Private Shops: Motors and Generators	Transformers	OTHER (Specify)			
TV Repair	2	10	15	70	5												
Adjuster	1	10	15	65	10												

23

37

Electricity/Electronics
Job Title Survey

3

28

Company Name _____

ELECTRICAL/ELECTRONIC EQUIPMENT REPAIR

JOB TITLES	Number of Workers	Electronic Equipment								Electrical Equipment				OTHER (Specify)			
		Customer Service Center				Private Shops				Customer Service Center		Private Shops					
		Gadgets	Radio	T.V.	Stereo	Gadgets	Radio	T.V.	Stereo	Motors and Generators	Transformers	Motors and Generators	Transformers				

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May 8, 1981

Plant Manager:

Several weeks ago your company received a questionnaire from us seeking your help to identify job titles in the electricity and electronics area.

Through a grant from the State Board of Vocational and Technical Education, the Institute For Performance Based Industrial Training, a non-profit organization, is investigating this area to gather "job title" data that will be helpful in designing industry-based vocational and technical programs.

We have enclosed another questionnaire in case the first one has been misplaced. Please take a few minutes to complete it--business and industry is the only source for this information. If you do not employ anyone in the electricity/electronics area, simply write "N/A" on the questionnaire and return it to us.

Thank you,

Sally

Sally Mathews
Principal Investigator

slw

Enclosure

IPBIT
P.O. BOX 40761
INDIANAPOLIS, INDIANA 46240

June 12, 1981

Plant Manager:

The purpose of this study is to identify the kinds of jobs, by job title, that exist in electricity and electronics, and to identify the tasks performed and the time spent on those tasks.

Tomorrow's workers are in Indiana schools today...and tomorrow's need for a better-trained work force will even be greater than it is now. That's why the Institute for Performance Based Industrial Training, a nonprofit organization, and the State Board of Vocational and Technical Education are dedicated to improving the vocational training of future Indiana workers.

As no great thing is created suddenly, the process of designing industry-based vocational and technical programs is an involved, but essential one...and one in which we need your help.

Please take a few minutes to complete the enclosed questionnaire and return it in the attached, self-addressed, self-stamped envelope.

Please return the survey even if you do not employ electrical/electronic job titles.

The information you can provide is crucial. Your help is essential. This information can only come from those of you who make up Indiana business and industry.

Thank you,

Sally

Sally Mathews
Principal Investigator

IPBIT

P.O. BOX 40761

INDIANAPOLIS, INDIANA 46240

APPENDIX C

Matrices

MANUFACTURING
(Electricity/Electronics)

CURRICULUM	TRAINING GROUP	JOB TITLE	TASKS	TRAINING GROUP CORE	CURRICULUM CORE	PROGRAM CORE
Power Transmission/ Distribution		Companies that employ people who spend the majority of their time in this curriculum area were not included in this survey. Such companies would be: public service electrical companies and huge companies that have their own power source such as Alcoa Aluminum at Newburgh.				Tasks and Learning Content Common to Manufacturing Program
Control Panel Instrumentation	Installation	Control Panel Assembler	List of Tasks For Each Job Title	Tasks & L.C.* Common to Installation Training Group	Tasks and Learning Content Common to Control Panel Instrumentation Curriculum	
		Control Panel Fabricator				
	Maintenance	Control Panel Technician	List of Tasks For Each Job Title	Tasks and Learning Content Common to Maintenance Training Group		
		Maintenance Electrician II				
		Test Equipment Technician				
	Design	Machine Computer Controls Person	List of Tasks For Each Job Title	Tasks and Learning Content Common to Design Training Group		
		Panel Designer				
Power Generation		Not surveyed				
General Repair/ Installation	Installation	Construction Electrician	List of Tasks For Each Job Title	Tasks & L.C. Common to Installation	Tasks and Learning Content Common to General Repair/ Installation Curriculum	
	Maintenance	AA Electrician	List of Tasks For Each Job Title	Tasks and Learning Content Common to Maintenance Training Group		
		Electrician				
		Electric Motor Repair Person				

*L.C.--learning content

MANUFACTURING
(Electricity/Electronics)

CURRICULUM	TRAINING GROUP	JOB TITLE	TASKS	TRAINING GROUP CORE	CURRICULUM CORE	PROGRAM CORE
General Repair/ Installation	Maintenance	Industrial Electrician	List of Tasks For Each Job Title	Tasks and Learning Content Common to Maintenance Training Group	Tasks and Learning Content Common to General Repair/ Installation Curriculum	Tasks and Learning Content Common to Manufacturing Program
		Maintenance Electrician				
		Maintenance Supervisor				
		Test Equipment Builder				
	Testing	Equipment Testing Technician	List of Tasks	Tasks & L.C.* Common to Testing Group		
Production	Installation	Product Designer Electrician	List of Tasks	Tasks & L.C. Common to Installation	Tasks and Learning Content Common to Production Curriculum	
	Maintenance	Testers	List of Tasks For Each Job Title	Tasks & L.C. Common to Maintenance Training Group		
		Troubleshooter				
	Design	Electrical Designer	List of Tasks For Each Job Title	Tasks & L.C. Common to Design Training Group		
		Electrical Detailer				
		Electronic Technician				
	Assembly	Electronic Assembler	List of Tasks For Each Job Title	Tasks & L.C. Common to Assembly Training Group		
		Product Assembler				
	Testing	Electronic Technician	List of Tasks For Each Job Title	Tasks & L.C. Common to Testing Training Group		
		Quality Control Technician				
		Tester Troubleshooter				
	Repair	Electronic Technician	List of Tasks	Tasks & L.C. Common to Repair Group		

*L.C.--learning content

MANUFACTURING
(Electricity/Electronics)

CURRICULUM	TRAINING GROUP	JOB TITLE	TASKS	TRAINING GROUP CORE	CURRICULUM CORE	PROGRAM CORE
Production	Installation	Production Wireman A	List of Tasks For Each Job Title	Tasks and Learning Content Common to Installation Training Group	Tasks and Learning Content Common to Production Curriculum	Tasks and Learning Content Common to Manufacturing Program
		Production Wireman B				
		Production Wireman C				
	Maintenance	Troubleshooter	List of Tasks	Tasks & L.C.* Common to Maintenance		

*L.C.--learning content

REPAIR SHOPS AND SERVICES
(Electricity/Electronics)

CURRICULUM	TRAINING GROUP	JOB TITLE	TASKS	TRAINING GROUP CORE	CURRICULUM CORE	PROGRAM CORE
Home Entertainment	Radio, TV, Stereo	Antenna Installer Bench Technician Communications Technician A Communications Technician B Communications Technician C Quick Check Technician TV Installer TV Repair Person TV Technician	List of Tasks For Each Job Title	Tasks and Learning Content Common to Radio, TV, Stereo Training Group	Tasks and Learning Content Common to Home Entertainment Training Group	Tasks and Learning Content Common to Repair Shops and Services Program
Home Appliance	White Goods	Appliance Installer Appliance Service Person Instrument Technician A Instrument Technician B Instrument Technician C Repair Technician(appliances) Senior Instrument Technician	List of Tasks For Each Job Title	Tasks and Learning Content Common to White Goods Training Group	Tasks and Learning Content Common to Home Appliance Training Group	
Business Machines	Calculator, Typewriter, Copier, Cash Register, Mail Equipment	Business Machine Repair Person Service Person Service Technician	List of Tasks For Each Job Title	Tasks & L.C.* Common to Calculator, Typewriter, Copier, Cash Register, Mail Equipment Group	Tasks & L.C. Common to Business Machines Curriculum	

*L.C.--learning content

REPAIR SHOPS AND SERVICES
(Electricity/Electronics)

CURRICULUM	TRAINING GROUP	JOB TITLE	TASKS	TRAINING GROUP CORE	CURRICULUM CORE	PROGRAM CORE
Business Machines	Micro-Computers	Production Test Person	List of Tasks For Each Job Title	Tasks & L.C.* Common to Micro-Computers Training Group	Tasks & L.C. Common to Business Mach. Training Group	Tasks and Learning Content Common to Repair Shops and Services Program
		Test Repair Person				
Industrial Equipment	Electrical Air Tools	Bench Repair Person	List of Tasks for each Job Title	Tasks and Learning Content Common to Electrical Air Tools Training Group	Tasks and Learning Content Common to Industrial Equipment Curriculum	
		Electrician				
		Group Leader				
		Service Manager				
	Motors, Generators, Transformers	Electrician Helper	List of Tasks for each Job Title	Tasks and Learning Content Common to Motors, Generators, Transformers Training Group		
		Electric Motor Repair Person				
		Motor Mechanic				
		Motor Winder				

*L.C.-learning content

FINAL REPORT ABSTRACT

A. The PROCESS/PRODUCT(S) to be adopted/adapted and delivered by this project were:

A job title matrix for the occupational area of Industrial Electricity and Electronics.

B. The specific OBJECTIVE of the proposal was to:

Develop an occupational matrix in the vocational service area of Industrial Electricity and Electronics.

C. The PROCEDURES for achieving this objective were:

1. Identify occupational area for study
2. Appoint advisory committee
3. Identify program, curricula, course dimensions of matrix
4. Identify survey population and select sample
5. Construct and field test survey instrument
6. Distribute surveys
7. Analyze data
8. Critique and review data
9. Distribute matrix

D. The expected OUTCOMES for or potential IMPACTS on vocational education were:

The matrix developed will provide a process model which can be used by decision makers to administratively structure PBVE programs and to identify the tasks corresponding to the job titles. Areas needing further study will also be identified.